

Supplemental Environmental Impact Statement for the Designation of Dredged Material Disposal Site(s) in Eastern Long Island Sound, Connecticut and New York

Draft



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and

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April 2016

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**SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR
THE DESIGNATION OF DREDGED MATERIAL DISPOSAL SITE(S)
IN EASTERN LONG ISLAND SOUND,
CONNECTICUT AND NEW YORK**

DRAFT

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Foreword:

This Draft Supplemental Environmental Impact Statement (DS EIS) is prepared under NEPA by USEPA Region 1 using a third party contracting process. The Connecticut Department of Transportation is the funding agency. Region 1 had reviewed the initial drafts prepared by Louis Berger and the University of Connecticut, with Region 1's direction and supervision. Region 1 then reviewed and, as necessary, directed revisions to the drafts from the contractors in order to produce this DEIS to be published for public review and comment. Cooperating agency representatives reviewed drafts of this document.

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Acronyms and Abbreviations

ACHP	Advisory Council on Historic Preservation
AIS	Automatic Identification System
aRDP	Apparent Redox Potential Discontinuity
AWOIS	Automatic Wreck and Obstruction Information System (a NOAA database)
BIS	Block Island Sound
BOEM	Bureau of Ocean Energy Management
CAA	Clean Air Act
CASE	Connecticut Academy of Science and Engineering
CCMA	Center for Coastal Monitoring and Assessment
CDIP	Coastal Data Information Program
C.F.R.	Code of Federal Regulations
CLDS	Central Long Island Sound Disposal Site (formerly abbreviated as CLIS)
CLIS	Central Long Island Sound (refers to the geographic region within the Sound)
cm	centimeter(s)
cm/s	centimeter per second
CO	Carbon monoxide
CPI	Consumer Price Index
CPUE	Catch per Unit Effort
CS	Cornfield Shoals
CSD	Cutter suction dredge
CSDS	Cornfield Shoals Disposal Site
CSO	Combined Sewer Overflow
CTDEEP	Connecticut Department of Energy and Environmental Protection
CTDOT	Connecticut Department of Transportation
CTDPH	Connecticut Department of Public Health
CT SHPO	Connecticut State Historic Preservation Office
cy	cubic yard(s)
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DAMOS	Disposal Area Monitoring System
DDT	Dichlorodiphenyltrichloroethane
DHS	Department of Homeland Security
DMMP	Dredged Material Management Plan

DO	Dissolved oxygen
DTM	Digital terrain model
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ELDS	Eastern Long Island Sound Disposal Site
ELIS	Eastern Long Island Sound
EMAP	Environmental Monitoring and Assessment Program
ENC	Electronic Navigational Charts (a NOAA database)
ERL	Effects Range – Low
ERM	Effect Range – Median
ESI	Environmental Sensitivity Index
FDA	Federal Drug Administration
FNP	Federal navigation project
FSEIS	Final Supplemental Environmental Impact Statement
ft	feet
ft/s	feet per second
FVCOM	Finite Volume Coastal Ocean Model (The model, nested within the University of Massachusetts-Dartmouth Regional Model, was used as the primary model for assessing the bottom stress, salinity, temperature, currents, waves, and horizontal circulation based on the data collected during the Physical Oceanographic study. The model is not commercially available.)
GHG	Greenhouse gas
GIS	Geographic Information System
GPS	Geographic Positioning System
GSP	Gross State Product
HAB	Harmful algal blooms
HMW	High molecular weight (applies to PAHs)
H _s	Significant wave height (measured in meters)
HP	horsepower
km	kilometer(s)
km ²	square kilometer(s)
km ³	cubic kilometer(s)
LIDAR	Light Detection and Ranging
LIS	Long Island Sound
LISICOS	Long Island Sound Integrated Coastal Observatory System
LISS	Long Island Sound Study

LISTS	Long Island Sound Trawl Survey
LNG	Liquefied Natural Gas
LPC	Limiting permissible concentration
LTFATE	Long-term FATE (USACE model that simulates long-term mound stability and sediment transport from dredged material disposal.)
LWRP	Local Waterfront Revitalization Program
LMW	Low molecular weight (applies to PAHs)
m	meter(s)
m ²	square meter(s)
m ³	cubic meter(s)
MARMAP	Marine Resources, Monitoring, Assessment and Prediction Program
MDMF	Massachusetts Division of Marine Fisheries
MRIP	Marine Recreational Information Program
µg/L	microgram/liter
MMPA	Marine Mammal Protection Act
µm	micrometer
mph	miles per hour
MPRSA	Marine Protection, Research, and Sanctuaries Act
m/s	meter(s)/second
n/a	Not available
NAAQS	National Ambient Air Quality Standards
NAD	North Atlantic Division, U.S. Army Corps of Engineers
NAD83	North American Datum of 1983
NAE	New England District, U.S. Army Corps of Engineers
NAN	New York District, U.S. Army Corps of Engineers
NB	Niantic Bay
NBDS	Niantic Bay Disposal Site
NCA	National Coastal Assessment (USEPA program)
NCCOS	National Centers for Coastal Ocean Science
NL	New London
nmi	nautical mile(s)
nmi ²	square nautical mile(s)
NEAMAP	North East Area Monitoring and Assessment Program
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act

NLDS	New London Disposal Site
NMFS	National Marine Fisheries Service
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRHP	National Register of Historic Places
NROC	Northeast Regional Ocean Council
NS&T	National Status and Trends (NOAA benthic surveillance program)
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOS	New York State Department of State
NY SHPO	New York State Historic Preservation Office
O ₃	Ozone
ODA	Ocean Dumping Act (see MPRSA)
ODMDS	Ocean (or ‘open-water’) dredged material disposal site
OPRHP	Office of Parks, Recreation and Historic Preservation
Pa	Pascal
PAH(s)	Polycyclic Aromatic Hydrocarbon(s)
PANYNJ	Port Authority of New York and New Jersey
PCB(s)	Polychlorinated Biphenyl(s)
PEIS	Programmatic Environmental Impact Statement
PM	Particulate matter
PO	Physical oceanography
POT	Peak-over-threshold
ppb	parts per billion
psu	practical salinity units
PV	Plan-view (photograph taken by a sediment profile system)
RHA	Rivers and Harbors Act
RICRMC	Rhode Island Coastal Resources Management Council
RIDEM	Rhode Island Department of Environmental Management
RIDFW	Rhode Island Division of Fish and Wildlife
RIDOH	Rhode Island Department of Health
RIEDC	Rhode Island Economic Development Corporation
RIGIS	Rhode Island Geographic Information System

RIM	Regional Implementation Manual
RIR	Rhode Island Region
RISDS	Rhode Island Sound Disposal Site (formerly abbreviated as RIDS in the literature)
RNC	Raster Navigational Chart
ROD	Record of Decision
RDP	Redox Potential Discontinuity
s	second(s)
SAIC	Science Application International Corporation
SAV	Submerged Aquatic Vegetation
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan (plan by states to attain air quality standards)
SMMP	Site Management and Monitoring Plan
SPI	Sediment profile imaging
SO ₂	Sulfur dioxide
SPP	Suspended particulate phase
STFATE	Short-Term FATE (USACE model simulating short-term effects in the water column during dredged material disposal)
SUNY	State University of New York
T	Dominant wave period (measured in seconds)
TMDL	Total maximum daily load
TOC	Total organic carbon
TSHD	Trailing suction hopper dredge
TRI	Toxics Release Inventory (publicly available USEPA database)
TSS	Total suspended solids
VOC	Volatile organic compound
UConn	University of Connecticut
URI	University of Rhode Island
USACE	U.S. Army Corps of Engineers (abbreviated as ‘Corps’ in the CLIS/WLIS EIS [USEPA and USACE, 2004a])
U.S.C.	U.S. Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WLDS	Western Long Island Sound Disposal Site (formerly abbreviated as WLIS)

WLIS	Western Long Island Sound (refers to the geographic region within the Sound)
WHG	Woods Hole Group
ZSF	Zone of Siting Feasibility

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EXECUTIVE SUMMARY

Introduction and Background

The U.S. Environmental Protection Agency (USEPA) is considering designation of one or more open-water dredged material disposal sites in the eastern region of Long Island Sound, off the coasts of Connecticut and New York (Figure ES -1), consistent with the Marine Protection, Research, and Sanctuaries Act (MPRSA, also known as the Ocean Dumping Act), 33 U.S.C. §§ 1401 *et seq.* Disposal of dredged material in the waters of Long Island Sound from projects that are either federal actions or non-federal actions involving more than 25,000 cubic yards (19,114 cubic meters) of dredged material must comply with the requirements of MPRSA. See 33 U.S.C. § 1416(f).

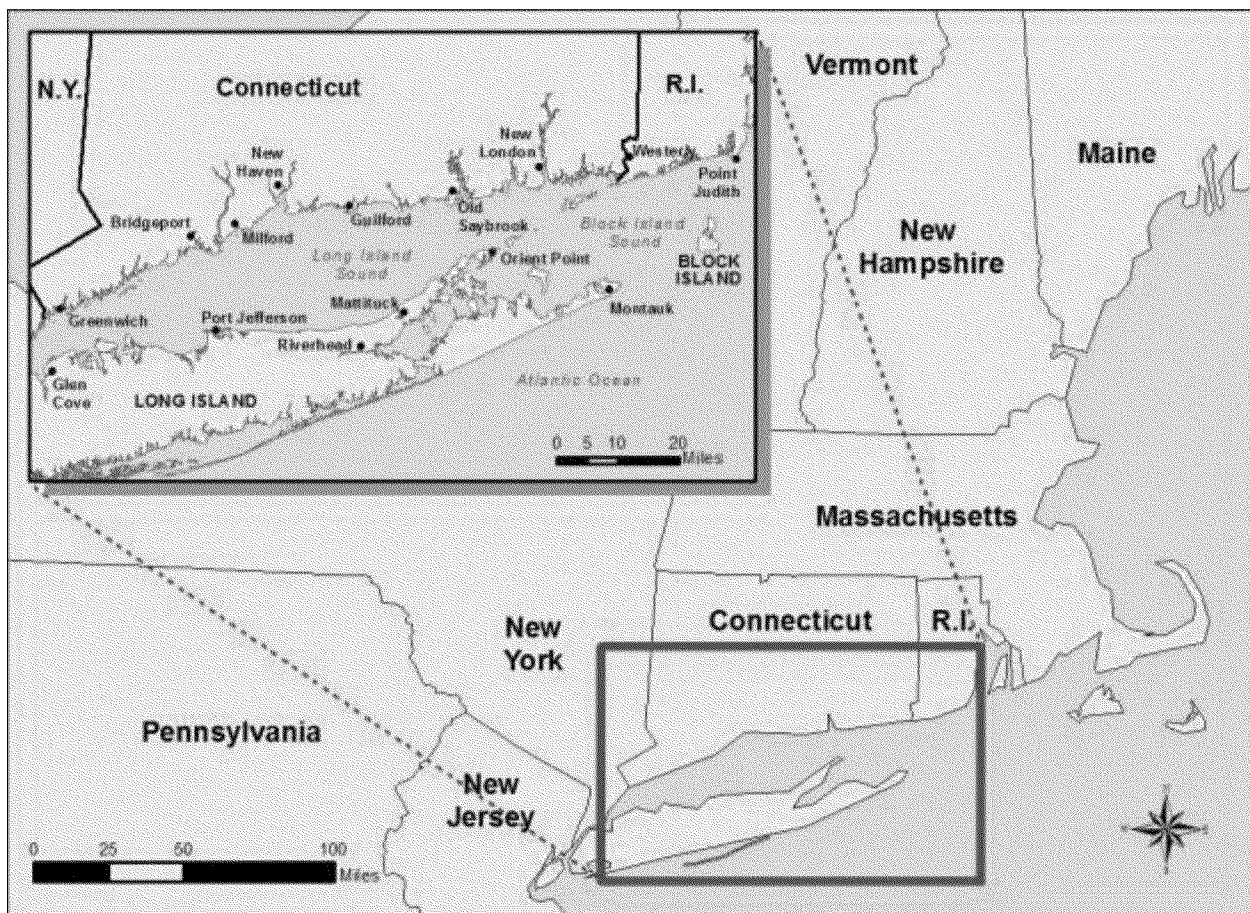


Figure ES-1. Location of Long Island Sound and Block Island Sound.

Through a site screening process that considered the five general and eleven specific criteria in the Ocean Dumping Act regulations as well as evaluation factors specific to Long Island Sound, USEPA has identified three potential alternative open-water dredged material disposal sites. Two

of the sites have been used recently as disposal sites, and one site is an inactive historic disposal site. If designated, one or more of these sites could be used for disposal of material dredged from navigation projects and other sources from rivers, harbors, and coastal areas in Connecticut, New York and southwestern Rhode Island, if the material is found to be suitable for open-water disposal. USEPA's designation of an open-water disposal site does not authorize disposal of material from any particular source or project at any designated site. Such material may be dredged and disposed of only if authorized by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act, 33 U.S.C. § 1344, Section 103 of the MPRSA, 33 U.S.C. § 1413, and/or Section 10 of the Rivers and Harbors Act, the latter of which statutes applies to the dredging itself (as opposed to the disposal), and other relevant provisions of law. In determining whether to authorize proposals to dispose of dredged material under Section 404 of the Clean Water Act and/or Section 103 of the MPRSA, the USACE applies environmental standards promulgated by USEPA under those statutory provisions.

USEPA is not legally required to subject its disposal site designations under the MPRSA to environmental review under the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 *et seq.*, but has nonetheless conducted a NEPA review pursuant to the agency's "Statement of Policy for Voluntary Preparation of National Environmental Policy Act (NEPA) Documents" (63 Fed. Reg. 58045 – 58047). Thus, while not legally required to do so, USEPA has prepared this Supplemental Environmental Impact Statement (SEIS) to be consistent with USEPA's NEPA-implementing regulations at 40 C.F.R. Part 6, Subparts A through D, as appropriate, while also using regulations promulgated by the Council on Environmental Quality at 40 C.F.R. Parts 1500-1508 to provide additional guidance.

This Draft SEIS (DSEIS) is being published together with Draft Site Management and Monitoring Plans (SMMPs) for public review and comment. Comments may be provided in writing (by mail or email). In addition, during the public comment period, USEPA will hold public hearings during which interested parties may submit comments. Information regarding the locations, dates, and times of the public hearings will be provided in the *Federal Register*, included in public notices and press releases, sent by email to the existing mailing list, and be posted on USEPA's website:

<https://www.epa.gov/ocean-dumping/dredged-material-management-long-island-sound#Eastern>

Following consideration of the comments received, USEPA will issue a Final SEIS (FSEIS). The FSEIS will include written responses to the significant comments. Concurrent with the release of the DSEIS, a proposed rulemaking will be published in the *Federal Register* for public comment. Following issuance of the FSEIS, the USEPA will publish a final rulemaking in the *Federal Register*.

Commenting on the DSEIS and SMMPs

USEPA encourages comments on the DSEIS for the Designation of Dredged Material Disposal Sites in Eastern Long Island Sound. Comments may be submitted:

By mail to:

U.S. Environmental Protection Agency
New England Region One
5 Post Office Square, Suite 100 (OEP06-1)
Boston, MA 02109

By email to:

elis@epa.gov

This action follows the designation of two disposal sites in western and central Long Island Sound, after the preparation of an Environmental Impact Statement (EIS) (USEPA and USACE, 2004a). The DSEIS for the eastern Long Island Sound builds on the analyses of this 2004 EIS.

Purpose and Need for Agency Action

The purpose of USEPA's action is to determine whether one or more environmentally sound open water dredged material disposal sites should be authorized for future long-term use in the eastern Long Island Sound region and, if so, to designate the site or sites accordingly and consistent with applicable law. The need for this effort derives from the following facts: (1) there are currently no disposal sites designated for long-term use within the eastern Long Island Sound region, (2) the USACE has determined that over the next 30 years there are dredging and dredged material disposal/handling needs that exceed the available disposal/handling capacity in the eastern region of Long Island Sound, (3) the two currently used sites are authorized under short-term authority that will expire in December 2016, (4) periodic dredging and dredged material disposal is necessary to maintain safe navigation and marine commerce, and (5) MPRSA requires a USEPA designation for any long-term dredged material disposal site.

Alternatives

In 2012, USEPA developed a Zone of Siting Feasibility (ZSF) for open-water sites for this SEIS with the assistance of cooperating agencies (Figure ES-2). Within this ZSF, USEPA identified and evaluated a range of specific disposal site alternatives.

The ZSF encompasses eastern Long Island Sound and Block Island Sound between Mulberry Point (near Guilford, Connecticut) to Mattituck Point (New York) on the western end, and Montauk (New York) to Block Island to Point Judith (Rhode Island) on the southern and eastern end. This ZSF was delineated because it has the potential to yield a site or sites that could reasonably address the dredging needs of the eastern Long Island Sound region given that it includes areas within a reasonable haul distance for marinas, boatyards, commercial docks, and federal harbors and anchorages in this region.

This SEIS analyzes the No Action Alternative and the potential environmental impacts associated with three alternative open-water dredged material disposal sites (*i.e.*, the Cornfield Shoals, Niantic Bay, and New London disposal site alternatives; Figure ES-2). These three alternative sites were identified following an extensive site screening process during the initial phases of the SEIS. This screening process took into account the specific site designation criteria described in the MPRSA regulations (40 C.F.R. 228.5 and 40 C.F.R. 228.6). After applying various criteria, the three alternative sites were recommended for further analysis in the SEIS.

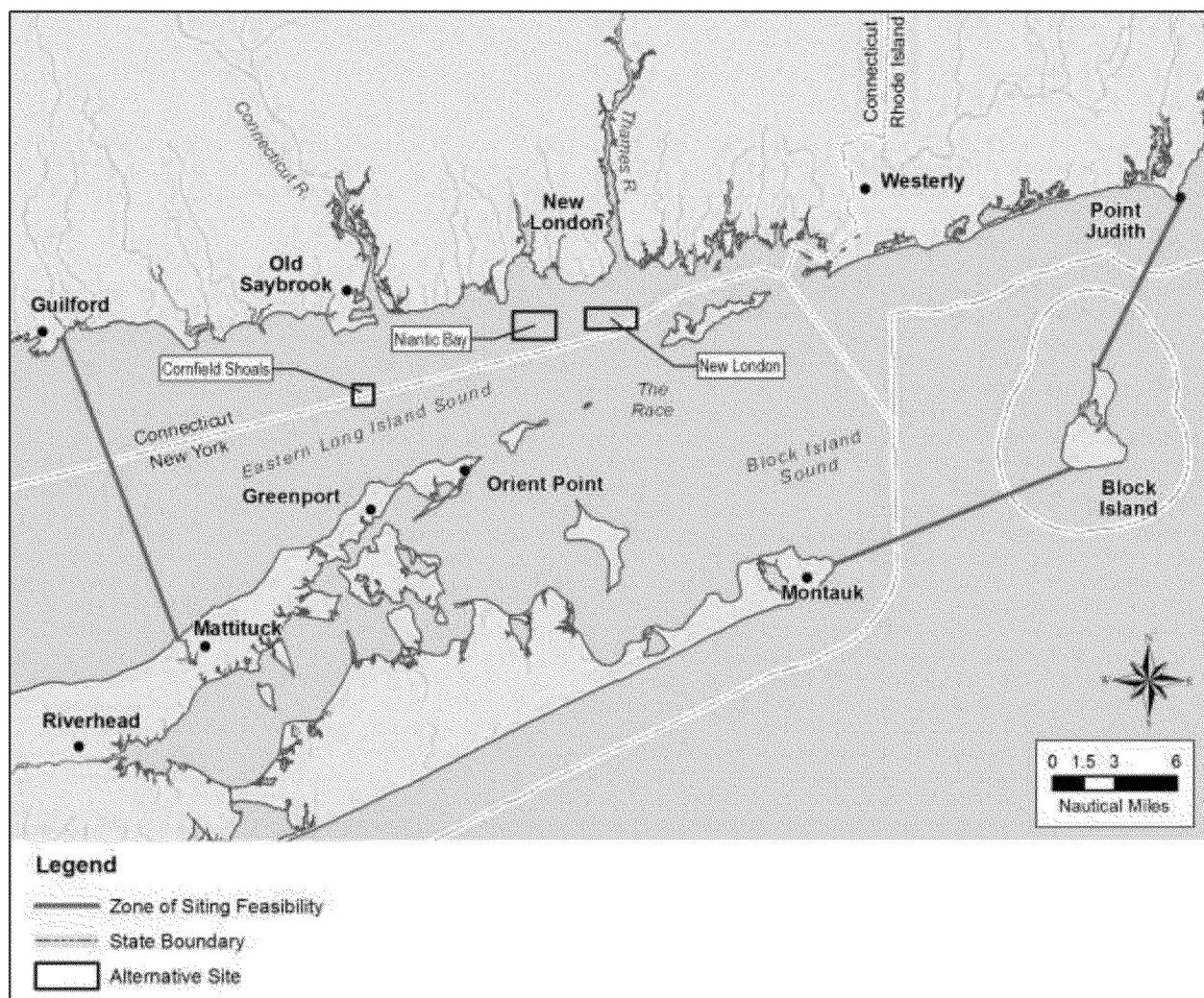


Figure ES-2. Zone of Siting Feasibility (Eastern Long Island Sound and Block Island Sound) and the three alternative open-water dredged material disposal sites evaluated in the SEIS.

The total estimated dredged material disposal needs for the eastern Long Island Sound region (*i.e.*, ports and harbors of Connecticut, New York, and southwestern Rhode Island, located within the ZSF) over the next 30 years are 22.6 million cubic yards (cy), or 17.3 million cubic meters (m^3). In order to identify disposal sites with the potential to handle this volume of dredged material, USEPA evaluated numerous sites within the ZSF. After screening out various sites, USEPA selected the following three alternative sites for more detailed evaluation: (1) The New London Alternative, which includes the existing NLDS and a 1.5 square nautical mile (nmi^2), or 5.1 square kilometer (km^2), area immediately to the west (Figure ES-3); (2) the Niantic Bay Alternative, which includes the area of the historic Niantic Bay Disposal Site (NBDS) and a 1.0 nmi^2 (3.4 km^2) area immediately to the east (Figure ES-4); and (3) the Cornfield Shoals Alternative, which has the same boundary as the active Cornfield Shoals Disposal Site (CSDS) (Figure ES-5). Each of these three Alternatives is described further below:

- **New London Alternative.** The New London Alternative is located to the south of the mouth of Thames River estuary. It has a total area of 2.5 nmi² (8.6 km²). The closest upland points to the alternative site are Goshen Point, Connecticut, approximately 1.2 nautical miles (nmi), or 2.2 kilometers (km), to the north, and Fishers Island, New York, 1.4 nmi (2.6 km) to the southeast.

The NLDS is an active open-water dredged material disposal site with an area of 1.0 nmi² (3.4 km²). Water depths range from approximately 46 to 79 feet (14 to 24 m). Most of the site is located within Connecticut waters, with the remainder of the site located in New York State waters. A total of approximately 8.9 million cy (6.8 million m³) of dredged material has been placed at this location since 1955. The dredged material mounds can rise up to 16 to 20 feet (5 to 6 m) above the surrounding seafloor. The sediments at the site are heterogeneous, but consist predominantly of fine sand and silt/clay. The NLDS is bisected by a 1,000-foot (300-m) wide submarine transit corridor that was established to minimize conflicts between disposal buoy positions and submarine traffic to and from the Submarine Base in Groton, Connecticut; disposal operations are monitored by the USACE to maintain a minimum water depth of 46 feet (14 m) within the corridor.

The 1.5 nmi² (5.1 km²) area immediately to the west of the NLDS is divided into “Site NL-Wa” and “Site NL-Wb”. Site NL-Wa has an area of 1 nmi² (3.4 km²). Water depths range from approximately 45 feet (14 m) in the north to 100 feet (30 m) in the south. Site NL-Wa consists of mostly sandy areas, but also contains an area of boulders and rocks in the northern part of the site. The water depth of parts of the boulder area is shallower than 59 feet (18 m). Site NL-Wb has an area of 0.5 nmi² (1.7 km²). It consists of an extension of the sandy areas of Site NL-Wa. The southwestern corner of the site contains an area of bedrock and boulders. Overall, water depths at Site NL-Wb range from approximately 59 feet (18 m) in the north to 95 feet (28 m) in the south.

- **Niantic Bay Alternative.** The Niantic Bay Alternative is located to the south of Niantic Bay, between the Connecticut and Thames Rivers. It consists of the historic NBDS and Site NB-E immediately to the east (Figure ES-3) with a total area of 2.8 nmi² (9.5 km²). The northern boundary of the Alternative is located approximately 0.6 nmi (1.1 km) from Black Point (southwestern corner of Niantic Bay) and 1.6 nmi (3.0 km) from Millstone Point in Waterford, Connecticut. The site is located entirely within Connecticut waters.

The NBDS was used historically for dredged material disposal; between 1969 and 1972, a total of 176,000 cy (135,000 m³) of dredged material was disposed at this location. The NBDS has an area of 1.8 nmi² (6.2 km²). Water depths at the site range from approximately 60 to 130 feet (18 to 40 m). Sediments at the site consist of sand to the north and northwest and mostly gravelly sediment with patches of gravel in the remainder of the area. The site contains a boulder area in its north-central part and scour depressions in the south.

The 1.0 nmi² (3.4 km²) area immediately to the east of the NBDS is referred to as “Site NB-E”. Water depths at Site NB-E range from 43 feet (13 m) in the north to 230 feet (70 m) in the southeast. Surface sediments at the site are generally similar to sediments at the NBDS. The southwestern corner of Site NB-E contains a bedrock and boulder area.

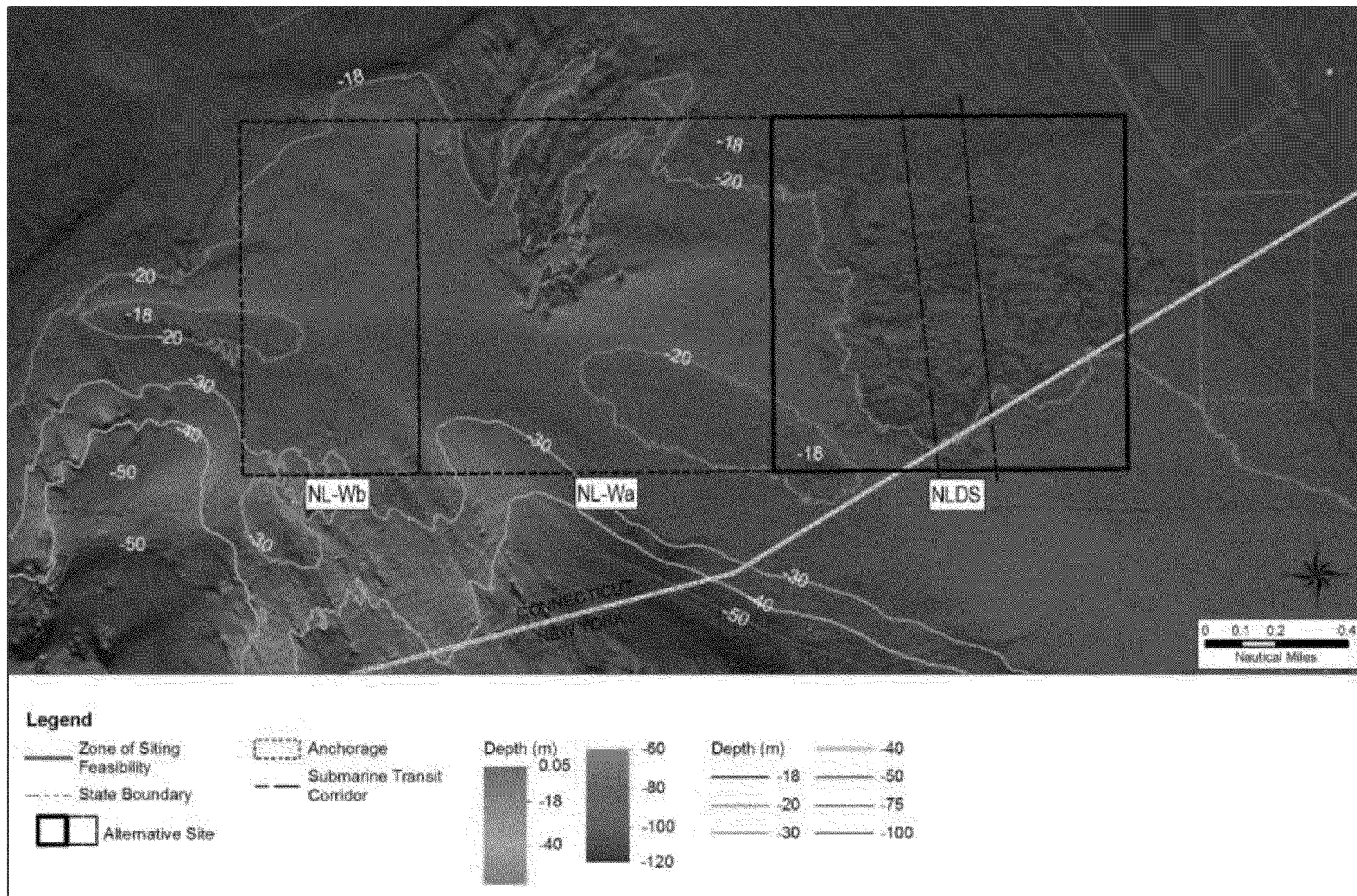


Figure ES-3. Location of the New London Alternative. The background represents water depth.

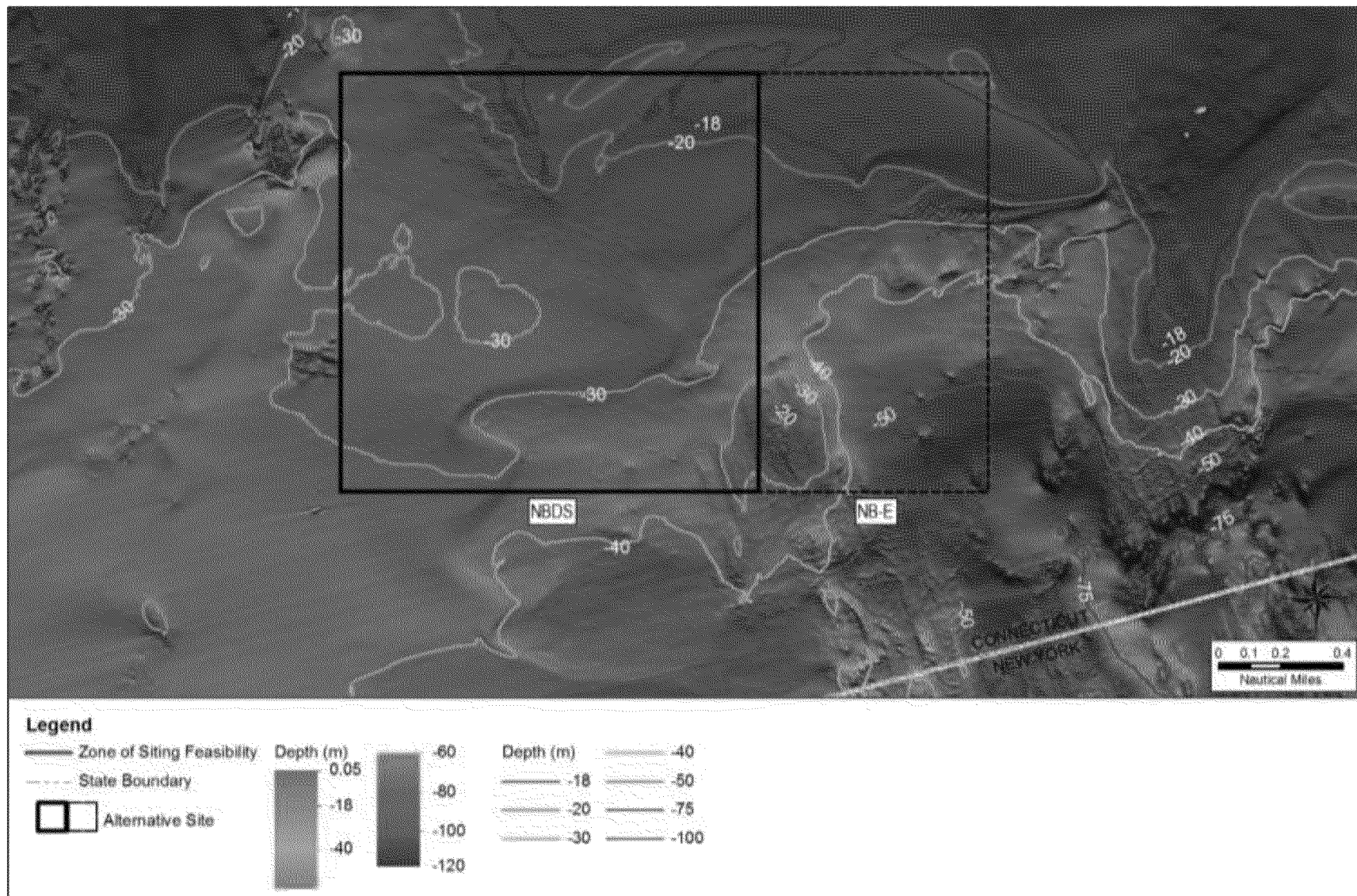


Figure ES-4. Location of the Niantic Bay Alternative. The background represents water depth.

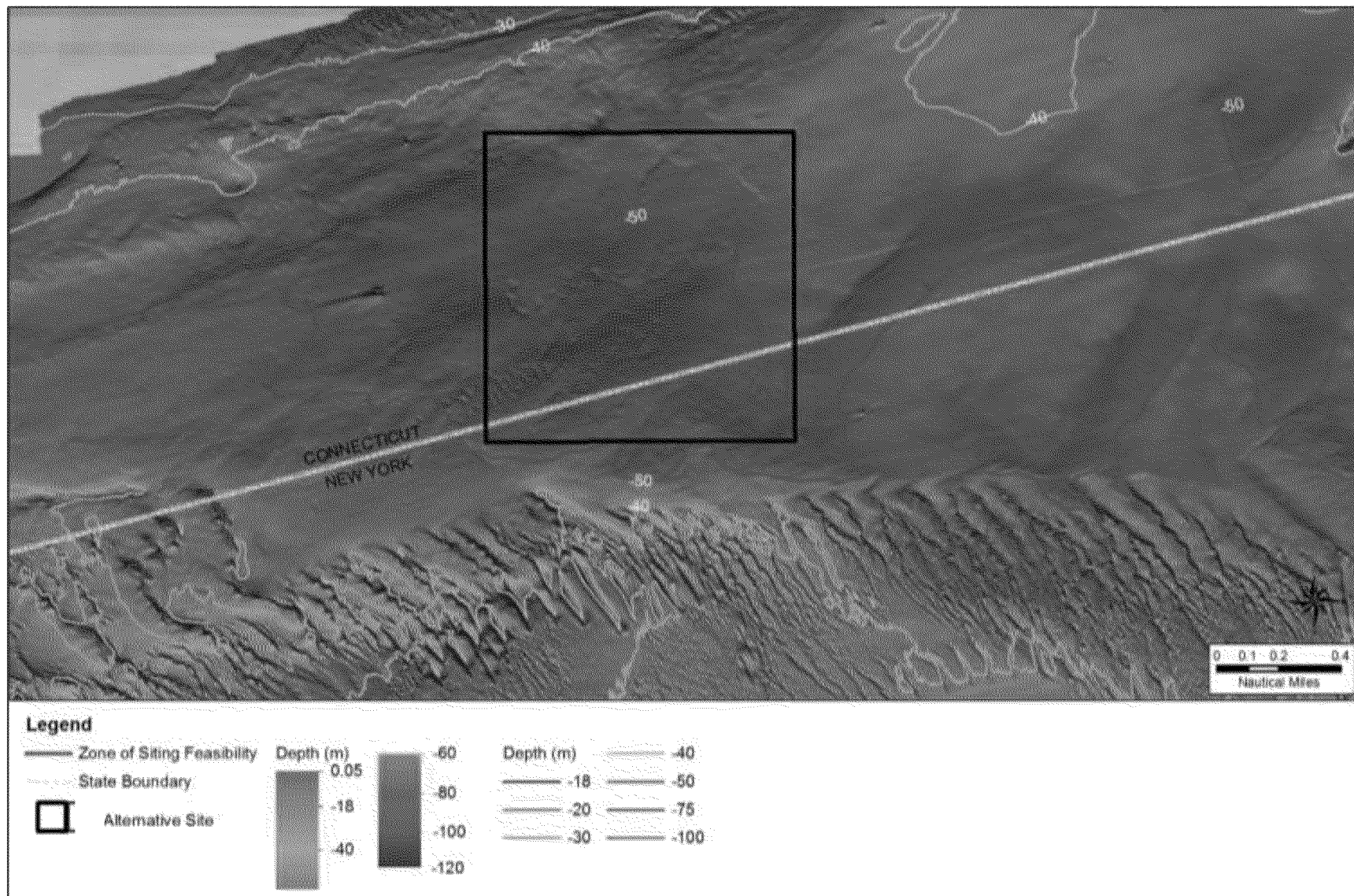


Figure ES-5. Location of the Cornfield Shoals Alternative. The background represents water depth.

- **Cornfield Shoals Alternative.** This Cornfield Shoals Alternative consists of the active CSDS, centrally located in eastern Long Island Sound. The center of the site is located 3.3 nmi (6.1 km) south of Cornfield Point in Old Saybrook, Connecticut. The site has an area of 1 by 1 nmi, or 1 nm² (3.4 km²), and is located mostly within Connecticut waters with the remainder of the site located in New York State waters. The water depth at the site is around 150 feet (50 m). Bottom currents at the site are directed generally in an east-west direction. The seafloor around the CSDS is relatively flat, with longitudinal ripples and other bedforms that suggests that sediments generally do not accumulate at the site. Surface sediments at the CSDS consist predominantly of sand with a smaller amount of silt/clay, as well as some gravel. The CSDS has received approximately 2.9 million cy (2.2 million m³) since 1960.

In addition to the three alternative dredged material disposal sites, USEPA analyzed the No Action Alternative. In this case, under the No Action Alternative, the proposed action of designating one or more disposal sites would not take place. This provides a baseline against which the proposed action and other alternatives can be evaluated. Evaluation of the No Action Alternative involves assessing the environmental and socioeconomic effects that would result if the actions under consideration did not take place. These effects can then be assessed and compared with the effects of the proposed action and other “action” alternatives. In this case, the No Action Alternative is not to designate an open-water site or sites in the eastern region of Long Island Sound for the long-term disposal of dredged material from navigation projects and other sources from rivers, harbors, and coastal area in Connecticut, New York, and southwestern Rhode Island.

While it is impossible to be certain how dredging needs resulting from sediment accumulation in the eastern Long Island Sound region would be handled if no disposal sites are designated under MPRSA, several hypothetical scenarios might reasonably be considered. First, disposal site authorization for private projects involving less than 25,000 cy (19,114 m³) of material would simply continue being evaluated on a project-specific basis under Section 404 of the Clean Water Act. Second, for projects subject to MPRSA (i.e., either federal projects of any size or private projects involving greater than 25,000 cy of material), project proponents would need to pursue one of the following actions:

1. Utilize a short-term open-water site inside or outside of the ZSF that has been newly “selected” by the USACE and concurred with by USEPA under MPRSA.
2. Use an existing designated long-term open-water site outside of the ZSF.
3. Await designation of a new disposal site outside of the ZSF.
4. Develop or utilize appropriate upland or nearshore disposal or beneficial use alternatives.
5. Cancel the proposed dredging projects.

In accordance with NEPA, alternatives to open-water disposal were also considered during the overall SEIS process. These included ocean disposal outside of the eastern Long Island Sound region, development of dredged material containment facilities, beneficial uses of dredged material (such as beach nourishment and nearshore berms), upland disposal sites, dredged material treatment options, and transport of material outside of the eastern Long Island Sound region. None of these alternatives are capable of meeting the long-term regional dredged material disposal needs

of the eastern Long Island Sound region. Therefore, potential open-water disposal sites were evaluated, suitable for accommodating the dredged material disposal needs for the region over the next 30 years.

Existing Conditions and Environmental Impacts at the Alternative Sites

The assessment of existing conditions in the ZSF was based on existing data and information, as well as SEIS-specific studies of the physical oceanographic characteristics, seafloor features, sediment chemistry, and biology. The following section describes the various environmental conditions in Long Island Sound and at the three alternative sites, and the potential environmental impacts that could occur as a result of dredged material disposal at these sites. A more detailed description of existing conditions in Block Island Sound is included in Chapter 4.

Physical Location and Setting

Long Island Sound is a 110-mile (177-km) long, semi-enclosed estuary located between the coastline of Connecticut and the northern coastline of Long Island, New York. The Connecticut-New York maritime state line runs east-west through the middle of Long Island Sound. Unlike most estuaries, Long Island Sound is connected to the ocean at both ends. The eastern end (“The Race”) of Long Island Sound presents an open passage to the North Atlantic Ocean, while the ocean passage at the western end is more restricted, traveling through the Narrows, along the East River, and around the western tip of Long Island.

The Long Island Sound region is adjacent to one of the most densely populated and industrialized regions in North America. Cargo and petroleum products are shipped through Long Island Sound to and from the New York City area and several ferries traffic people and goods between Long Island and Connecticut. Three of the major rivers that empty into Long Island Sound (the Housatonic, Connecticut, and Thames Rivers) originate farther north in New England, effectively connecting Massachusetts, New Hampshire, and Vermont to Long Island Sound.

Sedimentation and Erosion

The transport, dispersion, and eventual fate of sediment in the marine environment depend upon the physical characteristics of the sediment and the structure and dynamics of the water column. The physical parameters that are important in the transport and dispersion of sediment include currents, waves, and the density structure of the water column. Currents directly affect the transport and dispersion of sediment. In shallow water, waves can resuspend sediments previously deposited on the seafloor. These resuspended sediments may then be transported by local currents. The density structure of the receiving water, relative to the density of the sediment, influences how long the sediment remains in the water column.

The disposal of dredged material at open-water sites results in the deposition of non-native sediments in a “footprint,” or mound, at the disposal site. Over time, as currents move over this mound, hydraulic forces act on the sediment particles in the form of shear and lift. The response of the particles to these forces is related to current speed, particle size, shape, density, and any friction or cohesion exerted by adjacent sediment grains. At some point, the fluid exerts sufficient

force to cause the grains to move and the sediment will be eroded from the bottom and suspended (or resuspended) into the water column for transport. The potential for erosion of dredged material deposited at each of the alternative disposal sites was examined using sediment transport models.

The three alternative sites differ with regard to sedimentation and erosion potential. The New London Alternative would largely be a containment site where dredged material would remain on the seafloor, similar to conditions at the existing NLDS. The Cornfield Shoals Alternative would be a dispersive site where dredged material disposed at the site would be eroded over time and transported predominantly toward the west. The Niantic Bay Alternative would include both a containment area and a dispersive area; any fine-grained sediment that was resuspended in the dispersive area would initially be transported in the dominant direction of tidal flows (*i.e.*, east-west) and dispersed in eastern Long Island Sound.

Sediment Quality

Sediment quality can impact the aquatic habitats available to marine organisms, including benthic organisms, and communities of fish and other types of organisms. In support of this SEIS, the sediment quality at the alternative sites was evaluated. Evaluated parameters included grain size, total organic carbon, metals, organic contaminants, and sediment toxicity.

The existing sediment quality differs to some extent among the three alternative sites. Sediments at the Cornfield Shoals and Niantic Bay Alternatives are coarser-grained on average and have lower total organic carbon concentrations than at the New London Alternative. The finer grain sizes and higher total organic carbon content at the New London Alternative are mainly a result of the dredged material disposal at the NLDS. Similarly, while overall contaminant concentrations at the three alternative sites were low or not detected, some compounds in a few samples at the NLDS exceeded National Oceanographic and Atmospheric Administration (NOAA) guideline values for sediment quality. However, comparisons of metals and organic compounds in sediments from the three alternative sites to the NOAA guideline values indicated that the sediments at the three alternative sites are unlikely to cause adverse biological effects.

For the purpose of future disposal activities, any dredged material proposed for disposal at one of the alternative disposal sites would be tested and evaluated in accordance with applicable regulations prior to disposal. Such dredged material would have to satisfy the sediment quality criteria of USEPA's ocean disposal regulations before it would be approved for open-water disposal. Therefore, adverse effects to sediment quality as a result of dredged material disposal are not likely at any of the alternative sites.

Water Quality

Temporary water quality impacts may be caused at the disposal sites by short-term changes in particle concentrations following dredged material disposal. These changes result in sporadic and temporary (less than a few hours) increases in suspended solids in the water column due to unconsolidated sediments that are stripped away from the sediment mass as it descends through the water column to the seafloor. The term "turbidity" is often used to refer to total suspended solids in the water column; however, turbidity is more correctly defined as an optical property of

water referring to the blockage of light as it passes through water. Particles do not remain suspended in the water column indefinitely ; they fall to the bottom at settling rates that depend upon their size and density. Suspended sediments present in the water column during and after disposal operations can potentially affect the feeding activities of fish and benthic organisms, and at extremely high concentrations can kill or injure fish and benthic organisms. Contaminants present in the dredged material disposal plume can also potentially be available to marine organisms.

Dredged material disposed in Long Island Sound consists of material ranging from fine sand to silt and clay (e.g., USACE, 2015). While the bulk of the dredged material would settle to the bottom in the first few minutes after release, low concentrations of fine particles may persist for several hours in the water column, during which time they may be moved by the currents. To better define the potential impact of disposal on the water column and to compare the potential impacts across the alternative sites, a dredged material disposal model was applied at each of the alternative sites to predict disposal plume behavior. Specifically, the dispersion of dredged material in the water column after disposal was evaluated using the USACE Short-Term Fate (STFATE) model. Results of this modeling showed that, for disposal operations from a 3,000-cy scow, concentrations inside the site boundaries would decrease to below the limiting permissible concentration (LPC) within four hours after the release at all three alternative sites under various flow conditions. Concentrations would be below the LPC outside of the site boundaries at all times.

The amount of nutrients released from the descending dredged material into the water column is small relative to that associated with the receiving water at a well-mixed open-water disposal site. In addition, dredging removes organic and inorganic material from areas more vulnerable to eutrophication impairments. A concern in the past has been the potential of nutrient releases during dredged material disposal for stimulating harmful algal blooms (HABs) in the water column of Long Island Sound. However, the low nutrient load released into the water column during a disposal event, combined with the rapid dispersion of released nutrients by tidal flows in the comparatively open waters at disposal sites in Long Island Sound, results in a very low likelihood that nutrients in disposed dredged material contribute to triggering a HAB occurrence.

Benthic Invertebrates

The term “benthic community” refers to those invertebrate organisms (e.g., shellfish, worms, etc.) that live on or within the bottom substrate. Benthic invertebrates represent an important biological community that interacts closely not only with other communities in the overlying water, but also with the physical environment. Benthic communities are particularly useful for evaluating the effects of physical disturbances because they are relatively immobile, providing a site-specific measure of impacts.

While habitat quality and species diversity are good at all three alternative sites, they are slightly higher at the NLDS of the New London Alternative. All alternative sites are dominated by arthropods; however, the sediment at the New London Alternative contains more tube-dwelling amphipods compared to sediment at the other two alternative sites, which have more barnacles and bivalves. Overall, the habitat quality at the alternative sites is considered typical of surrounding

areas and the eastern basin of Long Island Sound. Additionally, the benthic communities at the active NLDS and CSDS show few effects of disturbance (including long-term effects from disposal activities).

The immediate impacts of dredged material disposal on the benthos would most likely be sudden reductions in infaunal abundances and species numbers, and, therefore, a reduction in species diversity. These impacts would be greatest near the central portion of the mound that forms during disposal. Available studies of the effects on benthic communities of disturbance (including dredged material disposal) indicate that the benthic habitats at a site would eventually be recolonized by a functioning infaunal community. Recolonization would mostly occur via migration from surrounding habitats or by the settling of the planktonic larvae of infaunal animals. Dredged material mounds with ongoing disposal activity at any given time within the three alternative sites would occupy less than 0.01% of the seafloor of eastern Long Island Sound. In summary, the potential for recolonization is high and similar among all alternative sites and long-term impacts would be minimal.

Finfish

Long Island Sound, a semi-enclosed estuary, is an important economic resource for both commercial and recreational/sport fisherman. Long Island Sound Trawl Surveys (LISTS), conducted by the Connecticut Department of Energy and Environmental Protection since 1984, have documented 105 finfish species in Long Island Sound. However, only a few of these species are considered year-round residents (*e.g.*, tautog). Most finfish species such as scup, bluefish, and striped bass migrate through the area in response to seasonal variations in water temperature, salinity, and access to spawning and nursery grounds in Long Island Sound. The overall abundance of finfishes and the species diversity in Long Island Sound has remained fairly stable since 1984. However, western and central Long Island Sound have shown significantly higher abundances compared to eastern Long Island Sound. This is likely a result of more extensive habitat with fine-grained sediments in western and central Long Island Sound that supports greater fish densities.

A trawl survey for the three alternative sites was conducted in June 2013. By far the most abundant finfish species present was scup; it also had the greatest biomass. The Cornfield Shoals Alternative had the highest species diversity, although it had by far the lowest abundance and finfish biomass compared to the other two Alternatives. While the New London Alternative had the highest finfish abundance, it had the lowest species diversity. Compared to surrounding areas, there was no significant difference between the abundance near and off of the three alternative sites for species of interest identified during the survey, namely scup, winter flounder, striped bass, bluefish, windowpane flounder, and striped sea robin.

Short-term impacts from dredged material disposal to finfish resources for all three alternative sites are minimal, consisting of local disruptions and some temporary loss of demersal species (*i.e.*, finfish that have an affinity to the seafloor). Most of the pelagic finfish species (*i.e.*, finfish that live in the open water with no affinity for the bottom or nearshore areas) that frequent the alternative sites would avoid disposal activities. Over time, recovery of the finfish resources to

pre-disposal levels would be expected for all alternative sites. Thus, long-term impacts would not be expected.

Similarly, long-term impacts to Essential Fish Habitat (EFH) for all three alternative sites would be negligible. Impacts to early life stages would be minimized by the implementation of dredging and disposal restrictions during the environmentally sensitive period from generally June 1 to September 30, as well as other location-specific seasonal restrictions to protect shellfish and finfish populations during their spawning and/or migration seasons (although hopper dredges involved in nearshore placement of sandy dredged material do work through the summer months in New England, including in Long Island Sound). Consultation with the National Marine Fisheries Services (NMFS) is ongoing.

Commercial and Recreational Shellfish

Certain species of shellfish comprise an important commercial and recreational fishery resource in nearshore areas of Long Island Sound. Important bivalve mollusk resources include the bay scallop, eastern oyster, hard clam, softshell clam, and surfclam. Lobster, longfin squid, horseshoe crab, channeled whelk, and knobbed whelk are also important resources. With the exception of lobster and longfin squid, commercially and recreationally important shellfish resources of Long Island Sound occur in shallow nearshore waters.

Of the commercial and recreational species, only longfin squid were present in the trawl survey at the alternative sites in any abundance. The other species were either not found to be present or had only a few individuals. Only five lobsters total were collected, all in the trawl near the New London Alternative. While the lobster abundance has always varied over time, the lobster population in Long Island Sound experienced unprecedented mortality in the fall of 1999, from which it has not recovered. Prior to 1999, lobsters were most abundant in western and central Long Island Sound. Since then, much of the remnant lobster population has been concentrated in deeper waters of central Long Island Sound and The Race.

There are potentially both short and long-term impacts to shellfish from the disposal of dredged material in eastern Long Island Sound. While these impacts can range from acute mortality associated with the burial of shellfish to the interrupted feeding and respiration by filter-feeding bivalves during periods of high turbidity, direct impacts to these organisms from the disposal of dredged material are generally limited to the footprint of the disposal mound.

The three alternative sites are located in deep water, away from shellfish beds. The general lack of species and overall low abundance of commercial and recreational shellfish at the alternative sites observed during the trawl survey indicates that impacts would be minimal and short-term, consisting mainly of direct burial and mortality of individuals that may be present at the time of disposal. Based on the relative abundances between the three alternative sites, it appears that impacts would be higher at the New London Alternative and lower at the Cornfield Shoals Alternative. However, because of the overall low abundance, none of the impacts would be expected to cause any measureable reduction in the population of any of the species potentially affected within eastern Long Island Sound.

Marine and Coastal Birds and Marine Mammals and Reptiles

The Atlantic coast supports a large number of resident and migratory marine and coastal birds. Dozens of marine and coastal birds migrate through Long Island Sound annually. In addition, Long Island Sound provides limited habitat for most marine mammals and reptiles. The species that are frequent or occasional visitors to the Sound and that may forage in the vicinity of the alternative sites include harbor porpoises, long-finned pilot whales, seals, and sea turtles.

Potential impacts to birds, marine mammals, and sea turtles could include temporarily reduced foraging opportunities during disposal activities and possible physical injury resulting from collisions with tugs and scows used to transport and place dredged materials. However, these impacts would be temporary with conditions rapidly returning to baseline conditions after a disposal event. Birds, marine mammals, or sea turtles foraging in the area would most likely move to a nearby location to resume foraging. Collisions with scows used during disposal activities are unlikely, because tugs and scows move slowly through the water, and most species would move out of the water to avoid a collision. Therefore, potential adverse impacts to these species or individuals would be minimal.

Endangered and Threatened Species

Atlantic and shortnose sturgeon could be seasonally present at the alternative sites, but they have not been frequently documented in Long Island Sound. Blueback herring, a Connecticut species of special concern, could also be seasonally present as they migrate through the area to their spawning grounds. Endangered and threatened birds may use the alternative sites for flyover or occasional foraging habitat, but are not expected to be present for long periods of time. All three alternative sites evaluated are located in offshore open water. Listed whale species are only occasionally present in the waters of Long Island Sound and are therefore not likely to be present at the alternative sites with any regularity. Harbor porpoises are common throughout Long Island Sound and are present year-round, but would only be present at the alternative sites while transiting the area or for occasional foraging. Sea turtles may be present in Long Island Sound between May 1 and November 15 of any year and may transit or forage in any of the alternative sites. Considering the mobility and distribution patterns of endangered or threatened species, the likelihood of encounters is approximately the same at the three alternative sites.

Endangered and threatened species would therefore only be present at the sites on an occasional incidental basis. Species present at a disposal area while disposal activities occur could potentially be affected by temporary increases in suspended sediment concentrations in the water column. However, these species are highly mobile and would be able to avoid these areas, and any effects would likely be minimal. Loggerhead, leatherback and Kemp's ridley sea turtles are all benthic feeders and often feed at depths similar to those found at the disposal sites. Disposed dredged material would likely bury benthic prey species, especially near the center portion of the disposal mound. However, the loss of these sites as potential foraging areas would not be expected to substantially impact the prey base for sea turtles in the area. Generally, dredging is prohibited from June 1 to September 30 of any year to protect shellfish and finfish populations during their spawning season (except for nearshore placement of sandy dredged material, as stated above); these time-of-year restrictions would further reduce potential impacts on all listed species.

USEPA has determined that the designation of a disposal site will not result in adverse impacts to endangered or threatened species, species of concern, or marine protected areas, essential fish habitat. In addition, the USACE will coordinate with the NMFS and USFWS for individual projects that are permitted to further ensure that impacts would not adversely impact any threatened or endangered species. Consultation with the NMFS and U.S. Fish and Wildlife Service is ongoing.

Bioaccumulation

Due to the presence of anthropogenic pollution sources, contaminants in water or sediment are available to aquatic organisms through a variety of pathways, including direct uptake from the water column, direct contact or ingestion of sediments or sediment pore water, and ingestion of contaminated prey. Once in the tissues of aquatic organisms, these chemicals can pose a health threat both to the organism directly and to other organisms (e.g., upper trophic level species, humans) that consume them. While bioaccumulation of a contaminant in an organism may or may not result in detrimental impacts to the organism, it can be an indicator that a population of the same or similar organisms, or of higher trophic level organisms that prey on the contaminated organisms, or both, may be potentially at risk of impact.

Potential risks associated with the bioaccumulation of chemicals from sediments present at the alternative sites were evaluated by comparing contaminant concentrations in tissues to Federal Drug Administration Action/Tolerance Levels for an assessment of potential human health impacts, and to Ecological Effect Values for an assessment of ecological impacts. The species considered were those species for which tissue contaminant data from the NLDS and CSDS were available (American lobster, clam, worm, winter flounder, scup, and striped bass). In summary, the risk analysis shows that given existing conditions, potential risks to human health and ecological receptors associated with exposure to sediments at the alternative sites are low.

The placement of dredged material at any of the alternative sites could have potential impacts associated with bioaccumulation of contaminants in selected species from sediment exposure. Impacts would depend on the nature of dredged materials placed at an alternative site. Further, residence time of dredged materials placed at an alternative site governs the ability of biota to come into equilibrium with contaminants in the dredged material. However, dredged material management policies and procedures for open-water disposal, as well as sediment quality criteria limiting the materials that may be authorized for open-water disposal, are designed to screen out dredged materials that may pose a risk to human or ecological receptors.

To evaluate potential human health and ecological risks at the alternative sites, bioaccumulation test and USEPA risk model results were analyzed for four dredging projects that were (or might be) dredged and placed at one of the alternative sites. The four dredging projects with bioaccumulation data and USEPA risk model results were all located in Connecticut (Gales Ferry, New London, Westbrook, and Old Saybrook). The data indicate that there is low potential for any future incremental risk from management of dredged sediments at the alternative sites either in the long or short-term. There is little potential for cumulative risk because the individual risks associated with each project are not additive. As long as the individual dredging projects meet

risk-based or concentration-based limits as required by the dredging program, the total number of such projects does not affect the risk at the alternative sites.

Socioeconomic Impacts

Long Island Sound is a region of social and economic importance with highly valuable resources. Potential socioeconomic impacts are those that relate to commercial and recreational fishing, shipping and navigation, recreational activities and beaches, parks and natural areas, historic and archaeological resources, and other human uses (military uses and mineral and energy development).

The potential impacts to commercial finfishing would be minimal because , among other reasons discussed above, the alternative sites are not prime finfish or shellfish habitats. Impacts to recreational fishing would be minimal as well and likely would not differ between the alternative sites. Commercial shipping and navigation would not be impacted , as the shallowest disposal depth permitted at a designated site would be 59 feet (18 m), and any interference during disposal operations would be mitigated through appropriate site management practices and notice to mariners. Disposal activities would not be expected to adversely impact the recreational activities, beaches, parks, and natural areas associated with any of the three alternative sites. There are no pipelines or cables located within the boundaries of any of the alternative sites.

The New London Alternative is the only site with a known exposed shipwreck located near the southern border of the site. Impact to the shipwreck would be avoided through appropriate site management, which includes a 164 feet (50 m) buffer zone around the shipwreck.

Air Quality and Noise

All five counties in the ZSF are part of moderate nonattainment areas for the 1997 ozone standard. Non-attainment zones are areas where the National Ambient Air Quality Standards have not been met. Ozone nonattainment zones are classified, in increasing degrees of severity, as follows: marginal, moderate, serious, severe, and extreme. New Haven, Middlesex and New London Counties (Connecticut) and Suffolk County (New York) are also marginal nonattainment areas for the stricter 2008 ozone standard.

Impacts to local air quality would consist mainly of exhaust fumes from tugs and other equipment used during operations. These minimal, short-term impacts would not be expected to differ between the alternative sites.

There are varying levels of background noise in and around Long Island Sound. Noise in the vicinity of navigation channels can include that generated by vessels, such as tugs and motorboats, and by dredges. Tugs would generate some minor noise while transporting the scows. Any minor noise impacts would be similar for the three alternative sites.

Cumulative Impacts

A cumulative impact on the environment is the impact that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. This type of assessment is important because significant cumulative impacts can result from several smaller actions that by themselves do not have significant impacts. The area of analysis for cumulative impacts is the entire Long Island Sound. Projects and activities that could interact with the proposed action to cause cumulative impacts on the resources of Long Island Sound as a whole include dredged material disposal events within the Sound, namely at the two designated Western and Central Long Island Sound Disposal Sites (WLDS, CLDS), and other, unrelated activities such as shipping, recreation, and fishing that occur on or near Long Island Sound.

Overall, any cumulative impacts from the proposed action on natural resources, as well as air quality and noise, would be imperceptible. Cumulative impacts to socioeconomic resources in the Long Island Sound region would be beneficial, as designation of dredged material disposal sites can facilitate that dredging of harbors and navigational channels, which would help keep harbors fully operational, thus avoiding a partial shift to truck traffic for some commercial goods.

Environmental Impacts of the No Action Alternative

Evaluation of the No Action Alternative involves assessing the environmental and socioeconomic effects that would result if the proposed action did not take place. These effects can then be assessed and compared with the effects of the proposed action and the other “action” alternatives.

Each of the No Action Alternative scenarios for projects subject to MPRSA presents a different set of consequences over the long-term. For Scenario 1 (utilize an alternative short-term open-water site either inside or outside of Long Island Sound that has been “selected” by the USACE and concurred with by USEPA under MPRSA), use of such sites is limited to no more than two five-year periods. Over the long-term, this approach would require the USACE to select sites as needed in the eastern Long Island Sound region or elsewhere. In contrast, USEPA’s MPRSA regulations favor the continued use of historically utilized sites (see 40 C.F.R. § 228.5(e) that states that “EPA will, wherever feasible, designate ocean dumping sites ... that have been historically used”). However, under this scenario, the two active disposal sites (NLDS and CSDS) would no longer be available, as the time limit for the use of these USACE-selected sites expires in December 2016. Moreover, to the extent that sites outside of the eastern Long Island Sound region were considered for selection by the USACE, the greater haul distances involved would increase the cost, duration, and ocean transport related impacts of each project. Depending on the distance from each dredging site to the particular disposal site, relying on sites selected outside the ZSF could potentially render some dredging projects infeasible. In addition, USACE-selected sites, unlike USEPA-designated sites, are not required to have SMMPs.

Under No Action Alternative Scenario 2 (use an already long-term designated site), the currently existing USEPA-designated disposal sites are located far from the eastern Long Island Sound region. The closest designated sites outside the ZSF are the Central Long Island Sound Disposal Site (CLDS) to the west and the Rhode Island Sound Disposal Site (RISDS) to the east. Reliance

on these sites would greatly increase the transport distance and thus the costs of dredging projects in the eastern Long Island Sound region. This would likely render many dredging projects too expensive to conduct and needed dredging would not take place. Furthermore, the greater transport distance would increase the risk of spills and short dumps.

Regarding No Action Alternative Scenario 3 (await designation of a different disposal site outside of the ZSF), no other site outside of the ZSF is currently under consideration. A potential site would have to be located on the continental shelf of the Atlantic Ocean, to the southeast of Montauk. There would be no significant advantage to such a site for the major dredging centers of the ZSF, as travel distances to a continental shelf site would be similar or greater than to the designated CLDS or RISDS. On the other hand, risks for accidents due to larger waves in the open Atlantic Ocean would be considerably greater.

Regarding No Action Alternative Scenario 4 (develop and utilize appropriate land-based or beneficial use alternatives), neither New York, Connecticut, nor southwestern Rhode Island have available upland sites or beneficial use sites which would provide a reasonable, long-term alternative to an open-water disposal site designation. The Long Island Dredged Material Disposal Plan (LIS DMMP) study conducted by the USACE has investigated various potential upland and beneficial use alternatives, but did not identify alternatives with sufficient long-term capacity for the finer-grained dredged material common in the eastern Long Island Sound region. However, such alternatives may be suitable for some dredging projects, assuming the dredged material satisfies specific requirements such as grain size, chemistry, etc. Another consideration is the proximity of a beneficial use or land-based site to the dredging site, which would affect cost and duration of dredging projects, possibly rendering some projects infeasible.

No Action Alternative Scenario 5 (cancel proposed dredging projects) would have serious adverse effects on navigational safety and marine-dependent commerce. Shoaling in navigation channels could result in more marine accidents and spills and use of other transportation methods to move products. Adverse environmental ramifications would include traffic congestion and other impacts from increased truck traffic on the region's highways and roads, as some of the cargo currently transported by sea would be transported on roads.

Conclusion

The initial site screening process led to the identification of three Action Alternative disposal sites (and several variations of those sites), as well as the No Action Alternative, for further evaluation in this document. The evaluation determined that any potential short-term, long-term, or cumulative impacts to the marine environment associated with the designation of any of the alternative sites would be minimal. Disposal site management and monitoring protocols for the preferred alternative are described in detail in the companion SMMPs.

USEPA is proposing to designate a New London open-water dredged material disposal site alternative within eastern Long Island Sound. Specifically, the proposed New London site consists of a reduced area of the full New London Alternative, encompassing the western portion of the NLDS and of Sites NL-Wa and NL-Wb, and has a total area of 2 nmi by 1 nmi (3.7 km by 1.9

km). These areas have been combined and will be collectively referred to as the “Eastern Long Island Sound Disposal Site” (ELDS). The New London site satisfies the MPRSA site selection criteria and, when properly monitored and managed as described in the SMMP, use of this site will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities. Furthermore, disposal at this site in a manner consistent with the restrictions imposed on the site with regard to disposal locations, time periods for disposal, and types of material to be disposed, as well as any other conditions consistent with the procedures and standards recommended by the LIS DMMP, would mitigate any potential adverse impacts to the environment to the greatest extent practicable. In addition, the New London Alternative (and therefore also the ELDS), as well as the Cornfield Shoals and Niantic Bay Alternatives, would avoid the substantial adverse socioeconomic impacts for the eastern Long Island Sound region that would be associated with the No Action Alternative.

The USEPA is interested in receiving public comment on this preferred alternative, as well as other options considered (see Section 5.8 of the DSEIS), to help inform its final determination.

Before any dredged material can be disposed of at any designated site, that material will first have to be tested according to applicable regulations and related national and regional guidance, and will have to satisfy the applicable legal requirements. As stated previously, non-federal dredging projects generating less than 25,000 cy (19,114 m³) of dredged material are subject only to the requirements of CWA § 404, whereas non-federal dredging projects generating 25,000 cy or more of dredged material, and all federal projects, are subject to the requirements of both the MPRSA and CWA § 404.